



Europäisches Patentamt

(19)

European Patent Office

Office européen des brevets



(11) Publication number : 0 572 181 A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number : 93303939.8

(51) Int. Cl.⁵ : G01G 23/04, G01G 19/00

(22) Date of filing : 20.05.93

(30) Priority : 28.05.92 US 889568

(43) Date of publication of application :
01.12.93 Bulletin 93/48

(84) Designated Contracting States :
CH DE FR GB LI

(71) Applicant : PITNEY BOWES INC.
World Headquarters One Elmcroft
Stamford Connecticut 06926-0700 (US)

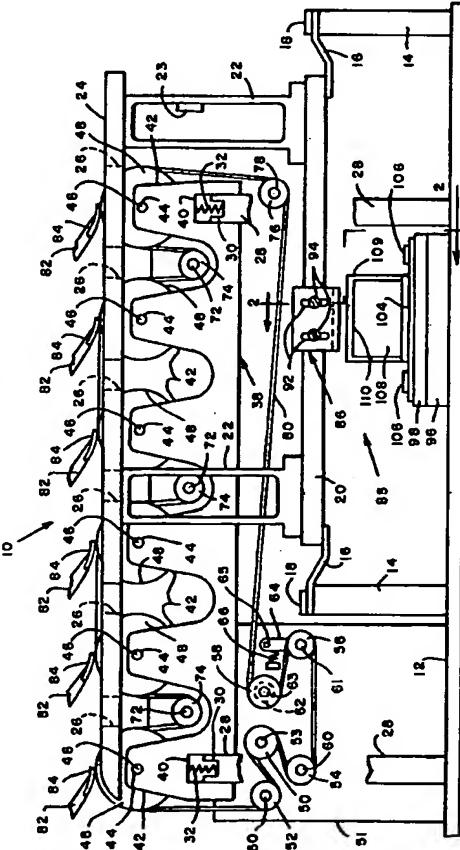
(72) Inventor : Dolan, Donald T.
97 Mimosa Circle
Ridgefield, CT 06877 (US)
Inventor : Pirc, Vladimir V.
42 Bayne Street
Norwalk, CT 06851 (US)
Inventor : Kelly, David D.
11 Princess Wenonah Drive
Shelton, CT 06484 (US)

(74) Representative : Cook, Anthony John et al
D. YOUNG & CO. 21 New Fetter Lane
London EC4A 1DA (GB)

(54) Locking mechanism for a vibrating tray scale.

(57) The locking mechanism (85) is applicable to a vibrating tray type scale which requires a mechanism for stabilizing a base (20) of the scale during period when articles are being conveyed onto and off a tray (24) of the scale. An electromagnetic locking mechanism (85) has been conceived that provides advantages for a vibrating tray scale. These advantages are simple construction, low cost, self compensation and zero force requirement. With such a locking mechanism, the vibrating tray scale functions more accurately and rapidly.

FIG. I



The present invention relates to a base locking mechanism for locking a base to a frame of a vibrating tray scale.

Weighing scales capable of rapidly weighing a series of flat articles have recently been developed. One type of such scale is a vibrating tray scale wherein a flat article is conveyed onto the platform of the scale, the conveying mechanism is removed from contact with the article, a holding device holds the flat article firmly on the platform, and the platform is oscillated thereby causing flex-members that support the platform to oscillate. A transducer is attached to one of the flex-members to measure the frequency of oscillation of the platform. Based upon such measurement, the weight of the article on the platform can be determined. Details relative to the structure of a vibrating tray scale, the method of operation and the method of determining the mass of an article thereon are fully described in U.S. Patent No. 4,778,018. With such a scale, one is able to weigh articles at rate of two to four articles per second. The rate of weighing depends upon the size of the articles to be weighed as well as the characteristics of the particular vibrating tray scale.

One of the important features of a vibrating tray scale is the need to lock the base of the scale when the tray is not being vibrated for purposes of obtaining the weight of an article on the tray. The base of the scale is that part which provides support to the flex-members and the base in turn is supported by a frame or housing. Various locking mechanisms have been used with success for the purpose of achieving stabilization of the base during the time articles are transported on and off the tray. In U.S. Patent No. 4,778,018 a solenoid type of device is used that clamps onto the base from the top and bottom. In U.S. Patent No. 4,836,311 a mechanism is described that not only provides a locking mechanism but also initiates the oscillation of the tray. In U.S. Patent No. 4,844,188 a mechanical locking device is shown that is activated to lock the base upon the article transporting mechanism being activated and deactivated when the article is to be weighed. Although all of these locking mechanisms have worked satisfactorily well, a need still exists for a relatively simple, reliable and fast locking mechanism.

The present invention aims to provide a locking mechanism for a vibrating tray scale that is not only simple, reliable and fast, but also contributes to greater weighing accuracy. This locking mechanism is used to lock the base of the weighing scale during the time flat articles are transported onto and off the tray before and after being weighed. The locking mechanism includes an armature that is attached to the base of the scale and an electromagnetic device that is secured, e.g. by a flexure spring, to the frame of the scale.

Upon energization of the electromagnetic device,

the biasing force of the spring is overcome and the electromagnet is attracted to and engages the armature to hold the base of the scale stationary. While the base is stationary, articles are transported onto and off the platform. During the weighing of the the articles, the electromagnet is de-energized and a spring removes the electromagnet from contact with the armature. During the period the electromagnetic device is disabled, an article can be weighed. After weighing, the base will be locked again by energizing the electromagnet, the article will be removed from the tray, and another article will be placed thereon.

The greater accuracy that accompanies use of the instant locking mechanism results from the self compensating effect of the mechanism, whereby the base is located in the position at which it comes to rest without being moved into a set position as was done with prior locking mechanisms.

The invention will be better understood from the following non-limiting description of an Example thereof given with reference to the accompanying drawings in which:-

Fig. 1 shows a cross sectional view of a vibrating tray scale that incorporates the instant invention;

Fig. 2 is a cross sectional view of the locking mechanism for the vibrating tray scale in the unlocked position taken along the lines 2-2 of Fig 1; Fig. 3 is a cross sectional view of the locking mechanism in the locked position taken along the lines 2-2 of Fig 1; and

Fig 4 is a plan view of a portion of the locking mechanism shown in Fig 2 and 3 and taken along the lines 4-4 of Fig 2.

With initial reference to Fig. 1, a vibrating tray scale is shown generally at 10 and includes a frame 12 to which two upright plates 14 are secured. A pair of angular leaf springs 16 (only two being shown) are secured to each upright plate 14, as for example with bolts 18, and the springs 16 support a base 20. Four flex-members 22 (only two being shown) are supported by the base 20 and in turn support a tray 24. One of the flex-members 22 has a transducer 23 attached thereto for measuring oscillation of the flex-members. The details of the flex-members 22 are shown and described in U.S. Patent No. 4,836,313 and will not be described in detail.

The tray 24 has a plurality of openings 26 therein. Two posts 28 are supported by the frame 12 and each has an opening 30. Each opening 30 receives a spring 32 therein. A carriage 38 has openings 40, each of which receives a post 28 and a spring 32, the springs having the effect of urging the carriage upwardly. The carriage 38 includes a plurality of laterally aligned pairs of projections 42, only one of each lateral pair being shown in Fig 1. Each projection has an opening 44. The openings 44 of paired projections 42 receive a shaft 46 that rotatably supports a roller 48. Reference can be had to U.S. Patent No. 4,844,188 for a

more detailed description to the carriage 38 and associated components.

A number of small rollers is supported by a wall 51 including a drive roller 50 and a plurality of idler rollers 52, 54, 56, and 58. The drive roller 50 is secured to the shaft 53 of a motor (not shown). The rollers 52 and 54 are idler rollers that are rotatably supported by pins 60 secured to the wall 51. The roller 58 is supported by a one way clutch 62 that in turn is mounted on a pin 63 secured to the wall 51. The roller 56 is rotatably supported by a pin 61 that is attached to a pivot arm 64. The pivot arm 64 is pivotally mounted on a pin 65 that is secured to the wall 51 and an expansion spring 66 has one of its ends attached to the pivot arm and its other end attached to an abutment 68 secured to the wall 51. This allows the roller 56 to be pivotally moved and urged in a counter-clockwise direction by the spring 66. Pins 72 are secured to the frame (by means not shown) intermediate the projections 42 and rotatably support rollers 74 and another roller 76 is rotatably mounted on a pin 78, the latter being supported by the frame (by means not shown). A belt 80 is trained about the rollers 48, 50, 52, 54, 56, 58, 74 and 76. By actuation of the one way clutch 62, thereby braking the roller 68, as the belt is being driven by the drive roller 50, the roller 56 will be driven in a clockwise direction as seen in Fig 1 and urged to the right so as to "contract" the belt 80 to cause the carriage 38 to be pulled downwardly to overcome the springs 32 of the brackets 28. Upon release of the one way clutch 62, the rollers 58 will rotate freely and the springs 52 will urge the carriage 38 upwardly. Reference can be had to U.S. Patent No. 4,844,188 for a full description as to the functioning of such a pull down and release mechanism. It will be appreciated that other pull down and release mechanisms can be used.

Located above the tray 24 and in registration with each roller 48 are a plurality of arms 82 each of which has a paddle 84 at the end thereof. The arms 82 are supported by the tray 24 by means not shown. Each paddle 84 engages the belt 80 portions trained about some of the rollers 48 when the carriage 38 is in its uppermost position. In such a position, when the drive roller 50 is rotated, and the one way clutch 62 is disengaged, mail placed between the nip of the first paddle 84 and the belt 80 will be conveyed onto the platform 24 until such time as the flat is observed (by means not shown). After the flat is observed, the one way clutch will be activated and the carriage 28 will be lowered. Again, reference can be had to U.S. Patent No. 4,844,188 for details of this operation. With the carriage 38 lowered, the article on the platform will be weighed as described in U.S. Patent No. 4,778,018.

What has been shown and described to this point does not form part of the locking mechanism and has been included only for the purpose of describing the

environment in which the locking mechanism is used.

Referring now particularly to Figs 2 and 3, a locking mechanism is shown at 85 and includes a generally L shaped armature 86 having elongated, vertically extending openings 92 which is attached to the base 20 as by bolts 94 received within the elongated openings. An elongated, laterally extending block 96 is secured to the frame 12 and supports a rigid platform 98 which has an opening 100 therein. Attached to the platform 98 is one end of a leaf spring 102, which leaf spring has a base portion 104 that is attached to the platform 98 as by bolts 106. An electromagnet 108 has a button 110 at the top thereof and is secured to the leaf spring 102 by a bolt 111 that is receivable within the opening 100. Secured intermediate the electromagnet 108 and leaf spring 102 is an L-shaped guard 109 the vertical extent of which is horizontally aligned with the top of the button 110. A power line 112 is connected to the electromagnetic 108 and is attached to any convenient power supply 114 (shown only in Fig 3). With such configuration, the leaf spring 102 urges the electromagnet 108 downwardly away from the armature 86 when no power is supplied to the electromagnet 108 by the power supply 114.

In operation, the vibrating tray scale 10 requires stabilization of the base 20 during non-weighing time in order to keep the base from swaying due to vibrations created when an article is being conveyed onto the tray 24. After an article has been transported onto the scale tray 24, the transport carriage 38 is lowered into the article non-contacting, weighing position, the locking mechanism 85 is de-energized, thereby allowing the spring 102 to pull the button 110 away from the armature 86 and releasing the base 20 to free the system for weighing. At the end of the weighing cycle, the locking mechanism 85 is re-energized by supply power from the power source 114 to restabilize the base.

When the electro magnet 108 of the locking mechanism 85 is energized, it is attracted to the armature 86 which is attached to the base 20 by the two adjusting screws 94. This causes the electro magnetic 108 to lift upwardly because of the magnet attraction to the armature 86 and become attached to the armature, thereby bending the leaf spring 102 as seen in Fig 3. Since the spring 102 and the block 96 are connected as one piece, they form a mechanical connection between the base 20 and the electromagnet 85 thus effectively connecting the base to the frame 12. The effect is to physically lock the scale base 20 to the frame 12 and create potential energy in the leaf spring 102. When the electromagnet 108 is deenergized, the leaf spring 102 will assume its original shape, as seen in Fig 2, to drive the the electromagnet to its lower position allowing a gap between the button 110 and the armature 86 thus freeing the scale base for weighing. For optimum perfor-

mance, the preferred gap between the button 110 and the armature 86 is adjusted to 0.030 inches when the locking mechanism 85 is deenergized.

The advantages of the locking mechanism 85 shown and described are that of simplicity and low cost, self compensation, zero force, and high efficiency. The locking mechanism 85 of the instant invention contains few components and thus is simple in structure and inexpensive in construction. The self compensating factor is a result of the position of the scale base 20 relative to the frame 12 dependent on the leveling of the frame on the frame's support. Since the scale generally has no means to level itself, a requirement of the locking mechanism is to lock the base 20 in whatever position it may come to rest. A mechanism that uses detents, whether single or multiple, tends to produce a predetermined locking position for the scale base 12. This in turn affects the accuracy of the scale since this predetermined locking position may not be the natural locking position. The locking mechanism 85 of the instant invention has infinite positioning accuracy within its range and eliminates the positioning effect which reduces scale accuracy.

Prior mechanisms lock the base by pressing on the base scale. Upon release, these mechanisms impart a movement to the scale base 20. The locking mechanism 85 of the instant invention does not have this undesirable effect and thus there is a zero force imparted to the base 20 during release. Furthermore, prior locking mechanisms require approximately 200 millamps at 60 volts, whereas the locking mechanism of the instant invention requires 40 millamps at 40 volts for an improvement factor of 3.3.

The above embodiment has been given by way of illustration only and other embodiments of the instant invention will be apparent to those skilled in the art from consideration of the detailed description and the attached drawing.

Claims

1. A base locking mechanism (85) for a vibrating tray scale comprising a base (20), flex-members (22) supported by said base, a frame (12), flexible support members (16) connecting said base to said frame, a tray (24) for receiving an article to be weighed, said tray (24) being supported by said flex-members (22), and means (82,84) for holding the article on said tray (24), said base locking mechanism (85) comprising:
an armature (86) secureable to said base (20),
an electromagnet (108) supportable by said frame (12) and movable into and out of engagement with said armature (86),
means (102) for urging said electromagnet (108) away from said armature (86), and

means (114) for supplying power to said electromagnet (108) to cause said electromagnet to be magnetically attracted to and engaged with said armature (86).

- 5
2. The locking mechanism of claim 1, further including means (94) for adjusting the gap between said armature (86) and said electromagnet (108) when said electromagnet is not energized.
- 10
3. The locking mechanism of claim 1 or 2, further including a stop (109) secured to said electromagnetic (108) and arranged to engage said armature (86), together with said electromagnet, when said electromagnet is energized.
- 15
4. The locking mechanism of any of claims 1 to 3, wherein said urging means (102) is a leaf spring connected to said electromagnet (108) at one end and connectable to said frame (12) at its other end (104).
- 20
5. A base locking mechanism (85) for a vibrating tray scale comprising a frame (12), a base (20), flexible support means (16) connecting said base to said frame, flex-members (22) supported by said base, a tray (24) for receiving an article to be weighed, said tray (24) being supported by said flex-members (22), and means (82,84) for holding the article on said tray (24), said base locking mechanism (85) comprising:
an armature (86) secureable to said base (20),
an electromagnet (108) movably supportable by said frame (12) and movable into and out of engagement with said armature (86),
means (102) for urging said electromagnet (108) away from said armature (86), and
means (114) for providing power to said electromagnet (108) to cause said electromagnet to be attracted to and engaged with said armature,
- 25
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300
305
310
315
320
325
330
335
340
345
350
355
360
365
370
375
380
385
390
395
400
405
410
415
420
425
430
435
440
445
450
455
460
465
470
475
480
485
490
495
500
505
510
515
520
525
530
535
540
545
550
555
560
565
570
575
580
585
590
595
600
605
610
615
620
625
630
635
640
645
650
655
660
665
670
675
680
685
690
695
700
705
710
715
720
725
730
735
740
745
750
755
760
765
770
775
780
785
790
795
800
805
810
815
820
825
830
835
840
845
850
855
860
865
870
875
880
885
890
895
900
905
910
915
920
925
930
935
940
945
950
955
960
965
970
975
980
985
990
995
1000
1005
1010
1015
1020
1025
1030
1035
1040
1045
1050
1055
1060
1065
1070
1075
1080
1085
1090
1095
1100
1105
1110
1115
1120
1125
1130
1135
1140
1145
1150
1155
1160
1165
1170
1175
1180
1185
1190
1195
1200
1205
1210
1215
1220
1225
1230
1235
1240
1245
1250
1255
1260
1265
1270
1275
1280
1285
1290
1295
1300
1305
1310
1315
1320
1325
1330
1335
1340
1345
1350
1355
1360
1365
1370
1375
1380
1385
1390
1395
1400
1405
1410
1415
1420
1425
1430
1435
1440
1445
1450
1455
1460
1465
1470
1475
1480
1485
1490
1495
1500
1505
1510
1515
1520
1525
1530
1535
1540
1545
1550
1555
1560
1565
1570
1575
1580
1585
1590
1595
1600
1605
1610
1615
1620
1625
1630
1635
1640
1645
1650
1655
1660
1665
1670
1675
1680
1685
1690
1695
1700
1705
1710
1715
1720
1725
1730
1735
1740
1745
1750
1755
1760
1765
1770
1775
1780
1785
1790
1795
1800
1805
1810
1815
1820
1825
1830
1835
1840
1845
1850
1855
1860
1865
1870
1875
1880
1885
1890
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
2055
2060
2065
2070
2075
2080
2085
2090
2095
2100
2105
2110
2115
2120
2125
2130
2135
2140
2145
2150
2155
2160
2165
2170
2175
2180
2185
2190
2195
2200
2205
2210
2215
2220
2225
2230
2235
2240
2245
2250
2255
2260
2265
2270
2275
2280
2285
2290
2295
2300
2305
2310
2315
2320
2325
2330
2335
2340
2345
2350
2355
2360
2365
2370
2375
2380
2385
2390
2395
2400
2405
2410
2415
2420
2425
2430
2435
2440
2445
2450
2455
2460
2465
2470
2475
2480
2485
2490
2495
2500
2505
2510
2515
2520
2525
2530
2535
2540
2545
2550
2555
2560
2565
2570
2575
2580
2585
2590
2595
2600
2605
2610
2615
2620
2625
2630
2635
2640
2645
2650
2655
2660
2665
2670
2675
2680
2685
2690
2695
2700
2705
2710
2715
2720
2725
2730
2735
2740
2745
2750
2755
2760
2765
2770
2775
2780
2785
2790
2795
2800
2805
2810
2815
2820
2825
2830
2835
2840
2845
2850
2855
2860
2865
2870
2875
2880
2885
2890
2895
2900
2905
2910
2915
2920
2925
2930
2935
2940
2945
2950
2955
2960
2965
2970
2975
2980
2985
2990
2995
3000
3005
3010
3015
3020
3025
3030
3035
3040
3045
3050
3055
3060
3065
3070
3075
3080
3085
3090
3095
3100
3105
3110
3115
3120
3125
3130
3135
3140
3145
3150
3155
3160
3165
3170
3175
3180
3185
3190
3195
3200
3205
3210
3215
3220
3225
3230
3235
3240
3245
3250
3255
3260
3265
3270
3275
3280
3285
3290
3295
3300
3305
3310
3315
3320
3325
3330
3335
3340
3345
3350
3355
3360
3365
3370
3375
3380
3385
3390
3395
3400
3405
3410
3415
3420
3425
3430
3435
3440
3445
3450
3455
3460
3465
3470
3475
3480
3485
3490
3495
3500
3505
3510
3515
3520
3525
3530
3535
3540
3545
3550
3555
3560
3565
3570
3575
3580
3585
3590
3595
3600
3605
3610
3615
3620
3625
3630
3635
3640
3645
3650
3655
3660
3665
3670
3675
3680
3685
3690
3695
3700
3705
3710
3715
3720
3725
3730
3735
3740
3745
3750
3755
3760
3765
3770
3775
3780
3785
3790
3795
3800
3805
3810
3815
3820
3825
3830
3835
3840
3845
3850
3855
3860
3865
3870
3875
3880
3885
3890
3895
3900
3905
3910
3915
3920
3925
3930
3935
3940
3945
3950
3955
3960
3965
3970
3975
3980
3985
3990
3995
4000
4005
4010
4015
4020
4025
4030
4035
4040
4045
4050
4055
4060
4065
4070
4075
4080
4085
4090
4095
4100
4105
4110
4115
4120
4125
4130
4135
4140
4145
4150
4155
4160
4165
4170
4175
4180
4185
4190
4195
4200
4205
4210
4215
4220
4225
4230
4235
4240
4245
4250
4255
4260
4265
4270
4275
4280
4285
4290
4295
4300
4305
4310
4315
4320
4325
4330
4335
4340
4345
4350
4355
4360
4365
4370
4375
4380
4385
4390
4395
4400
4405
4410
4415
4420
4425
4430
4435
4440
4445
4450
4455
4460
4465
4470
4475
4480
4485
4490
4495
4500
4505
4510
4515
4520
4525
4530
4535
4540
4545
4550
4555
4560
4565
4570
4575
4580
4585
4590
4595
4600
4605
4610
4615
4620
4625
4630
4635
4640
4645
4650
4655
4660
4665
4670
4675
4680
4685
4690
4695
4700
4705
4710
4715
4720
4725
4730
4735
4740
4745
4750
4755
4760
4765
4770
4775
4780
4785
4790
4795
4800
4805
4810
4815
4820
4825
4830
4835
4840
4845
4850
4855
4860
4865
4870
4875
4880
4885
4890
4895
4900
4905
4910
4915
4920
4925
4930
4935
4940
4945
4950
4955
4960
4965
4970
4975
4980
4985
4990
4995
5000
5005
5010
5015
5020
5025
5030
5035
5040
5045
5050
5055
5060
5065
5070
5075
5080
5085
5090
5095
5100
5105
5110
5115
5120
5125
5130
5135
5140
5145
5150
5155
5160
5165
5170
5175
5180
5185
5190
5195
5200
5205
5210
5215
5220
5225
5230
5235
5240
5245
5250
5255
5260
5265
5270
5275
5280
5285
5290
5295
5300
5305
5310
5315
5320
5325
5330
5335
5340
5345
5350
5355
5360
5365
5370
5375
5380
5385
5390
5395
5400
5405
5410
5415
5420
5425
5430
5435
5440
5445
5450
5455
5460
5465
5470
5475
5480
5485
5490
5495
5500
5505
5510
5515
5520
5525
5530
5535
5540
5545
5550
5555
5560
5565
5570
5575
5580
5585
5590
5595
5600
5605
5610
5615
5620
5625
5630
5635
5640
5645
5650
5655
5660
5665
5670
5675
5680
5685
5690
5695
5700
5705
5710
5715
5720
5725
5730
5735
5740
5745
5750
5755
5760
5765
5770
5775
5780
5785
5790
5795
5800
5805
5810
5815
5820
5825
5830
5835
5840
5845
5850
5855
5860
5865
5870
5875
5880
5885
5890
5895
5900
5905
5910
5915
5920
5925
5930
5935
5940
5945
5950
5955
5960
5965
5970
5975
5980
5985
5990
5995
6000
6005
6010
6015
6020
6025
6030
6035
6040
6045
6050
6055
6060
6065
6070
6075
6080
6085
6090
6095
6100
6105
6110
6115
6120
6125
6130
6135
6140
6145
6150
6155
6160
6165
6170
6175
6180
6185
6190
6195
6200
6205
6210
6215
6220
6225
6230
6235
6240
6245
6250
6255
6260
6265
6270
6275
6280
6285
6290
6295
6300
6305
6310
6315
6320
6325
6330
6335
6340
6345
6350
6355
6360
6365
6370
6375
6380
6385
6390
6395
6400
6405
6410
6415
6420
6425
6430
6435
6440
6445
6450
6455
6460
6465
6470
6475
6480
6485
6490
6495
6500
6505
6510
6515
6520
6525
6530
6535
6540
6545
6550
6555
6560
6565
6570
6575
6580
6585
6590
6595
6600
6605
6610
6615
6620
6625
6630
6635
6640
6645
6650
6655
6660
6665
6670
6675
6680
6685
6690
6695
6700
6705
6710
6715
6720
6725
6730
6735
6740
6745
6750
6755
6760
6765
6770
6775
6780
6785
6790
6795
6800
6805
6810
6815
6820
6825
6830
6835
6840
6845
6850
6855
6860
6865
6870
6875
6880
6885
6890
6895
6900
6905
6910
6915
6920
6925
6930
6935
6940
6945
6950
6955
6960
6965
6970
6975
6980
6985
6990
6995
7000
7005
7010
7015
7020
7025
7030
7035
7040
7045
7050
7055
7060
7065
7070
7075
7080
7085
7090
7095
7100
7105
7110
7115
7120
7125
7130
7135
7140
7145
7150
7155
7160
7165
7170
7175
7180
7185
7190
7195
7200
7205
7210
7215
7220
7225
7230
7235
7240
7245
7250
7255
7260
7265
7270
7275
7280
7285
7290
7295
7300
7305
7310
7315
7320
7325
7330
7335
7340
7345
7350
7355
7360
7365
7370
7375
7380
7385
7390
7395
7400
7405
7410
7415
7420
7425
7430
7435
7440
7445
7450
7455
7460
7465
7470
7475
7480
7485
7490
7495
7500
7505
7510
7515
7520
7525
7530
7535
7540
7545
7550
7555
7560
7565
7570
7575
7580
7585
7590
7595
7600
7605
7610
7615
7620
7625
7630
7635
7640
7645
7650
7655
7660
7665
7670
7675
7680
7685
7690
7695
7700
7705
7710
7715
7720
7725
7730
7735
7740
7745
7750
7755
7760
7765
7770
7775
7780
7785
7790
7795
7800
7805
7810
7815
7820
7825
7830
7835
7840
7845
7850
7855
7860
7865
7870
7875
7880
7885
7890
7895
7900
7905
7910
7915
7920
7925
7930
7935
7940
7945
7950
7955
7960
7965
7970
7975
7980
7985
7990
7995
8000
8005
8010
8015
8020
8025
8030
8035
8040
8045
8050
8055
8060
8065
8070
8075
8080
8085
8090
8095
8100
8105
8110
8115
8120
8125
8130
8135
8140
8145
8150
8155
8160
8165
8170
8175
8180
8185
8190
8195
8200
8205
8210
8215
8220
8225
8230
8235
8240
8245
8250
8255
8260
8265
8270
8275
8280
8285
8290
8295
8300
8305
8310
8315
8320
8325
8330
8335
8340
8345
8350
8355
8360
8365
8370
8375
8380
8385
8390
8395
8400
8405
8410
8415
8420
8425
8430
8435
8440
8445
8450
8455
8460
8465
8470
8475
8480
8485
8490

8. The locking mechanism of any of claims 5 to 7,
wherein said urging means (102) is a leaf spring
having a first end (104) securable to said frame
(12) and said electromagnetic (108) is supported
by the second end of said leaf spring. 5
9. A vibrating tray scale comprising a base (20),
flex-members (22) supported by said base, a
frame (12), flexible support members (16) con-
necting said base to said frame, a tray (24) for re-
ceiving an article to be weighed, said tray (24) being
supported by said flex-members (22), means
(82,84) for holding the article on said tray (24),
and a base locking mechanism (85) comprising:
an armature (86) secured to said base
(20),
an electromagnet (108) supported by said
frame (12) and movable into and out of engage-
ment with said armature (86), 10
means (102) for urging said electromagnet
(108) away from said armature (86), and
means (114) for supplying power to said
electromagnet (108) to cause said electromag-
netic to be magnetically attracted to and engaged
with said armature (86). 15
10. The vibrating tray scale of claim 9, wherein said
urging means (102) is a leaf spring connected to
said electromagnet (108) at one end and said
frame (12) at its other end (104). 20
25
30

35

40

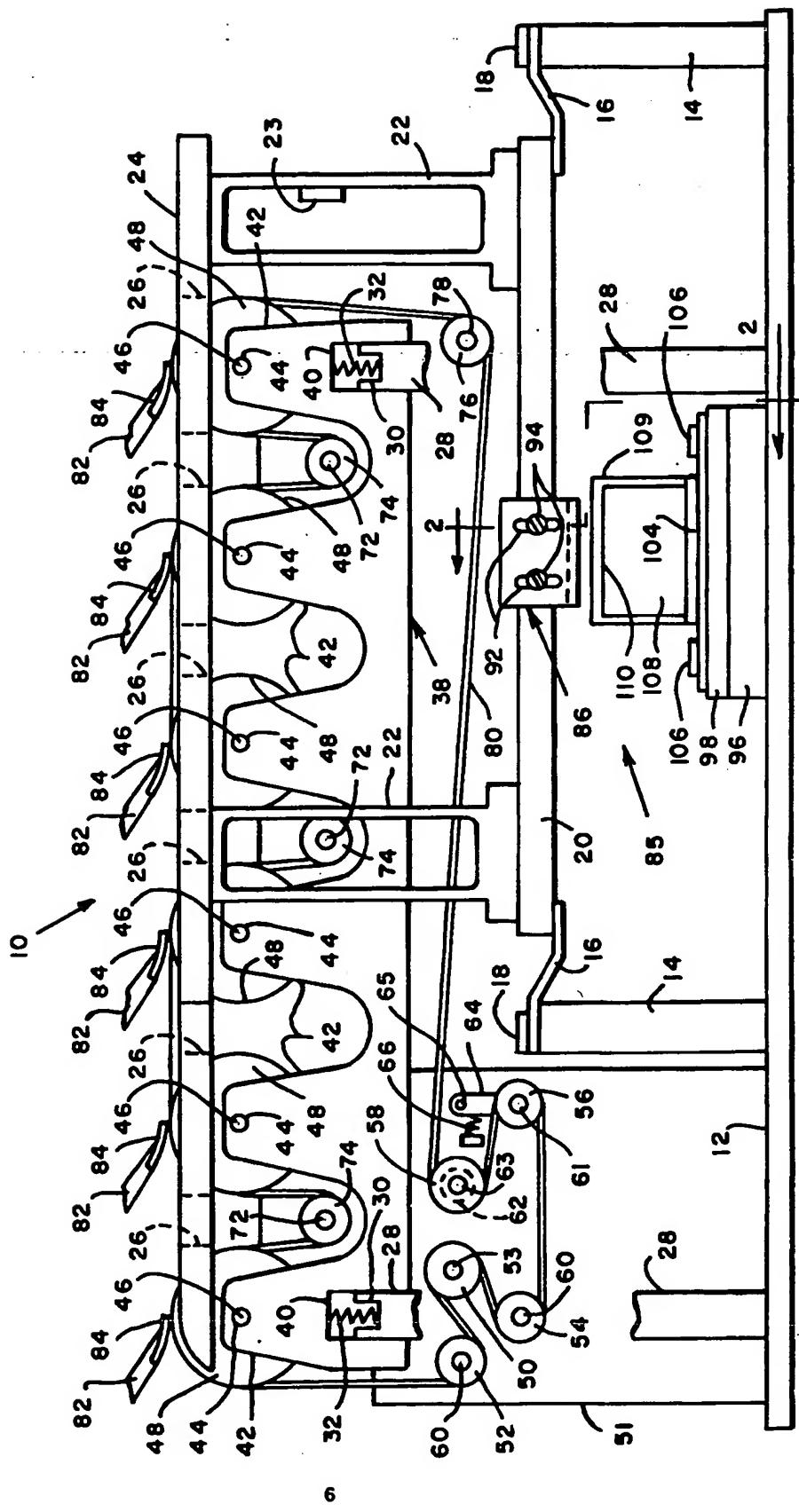
45

50

55

5

FIG. I



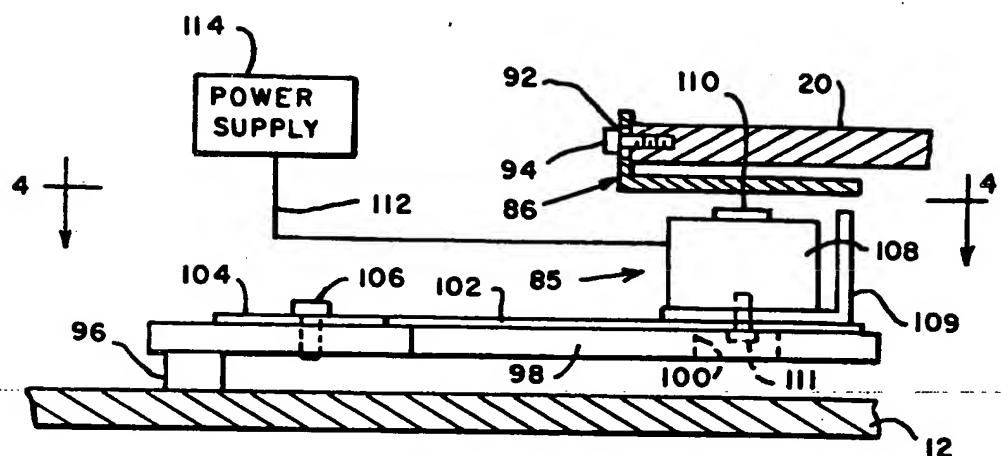


FIG. 2

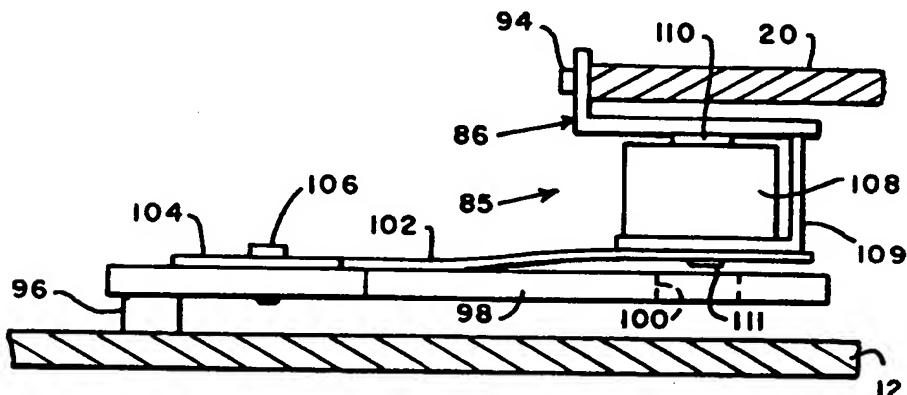


FIG. 3

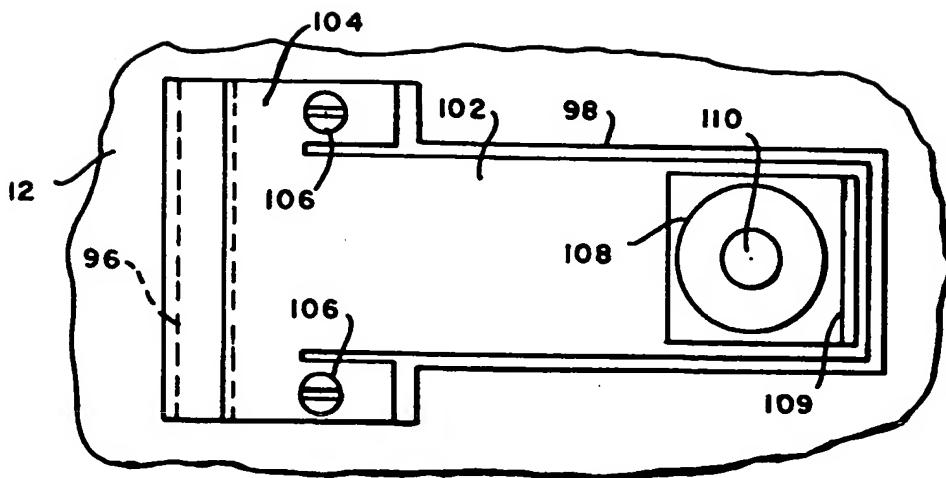


FIG. 4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 30 3939

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. CLS)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
Y	US-A-4 842 084 (VLADIMIR V. PIRC) * abstract * * column 4, line 46 - line 64; figures 1,5 * --- EP-A-0 114 075 (K.K. ISHIDA KOKI SEISAKUSHO) * page 11, line 9 - page 12, line 20; figures 7,8 *	1,5,9	G01G23/04 G01G19/00
A,D	US-A-4 836 311 (DAVID W. HUBBARD) * column 4, line 43 - line 68; figures 5,10A,10B *	1	
			TECHNICAL FIELDS SEARCHED (Int. CLS)
			G01G
<p>The present search report has been drawn up for all claims</p>			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	18 AUGUST 1993	GANCI P.A.	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			